EXHIBIT 1

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Kenji Hosaka et al.
Serial Number:	10/574,038
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Examiner/Art Group Unit:	E. Enin-Okut/1795
Title:	BIPOLAR ELECTRODE BATTERIES AND METHODS OF MANUFACTURING BIPOLAR ELECTRODE BATTERIES

DECLARATION PURSUANT TO 37 CFR §1.132

M.S. Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Dr. Shigeo Ibuka, do hereby declare as follows:

1. I am an employed by the Assignee of the present invention, Nissan Motor Co., Ltd. ("Nissan"), 1, Natsushima-cho, Yokosuka-shi, Kanagawa 237-8523, Japan, as an engineer in its Next Generation Battery Development Group.

2. I have a doctorate in electrical chemistry, and I have two years of experience specific to the field of lithium ion batteries, including those formed of bipolar electrodes.

3. I have reviewed the Examiner=s Office Action dated December 16, 2008 and the references cited in the rejection of the claims.

4. In my opinion as someone skilled in the art of bipolar battery materials and design, the battery structure as claimed in the application at issue is not anticipated by Munshi (U.S. Patent No. 6,664,006).

5. The claimed invention is a battery comprising a bipolar electrode stack

comprising a collector, a cathode electrically connected to a first side of the collector, an anode electrically connected to a second side of the collector, and one or more electrolyte layers overlaying the cathode and anode. The collector comprises a high-polymer material containing a plurality of electrically conductive particles. The cathode and anode are in direct contact with at least a portion of the high-polymer material of the collector.

6. One role of the current collector in a bipolar battery is to conduct the electric charge generated in the negative electrode horizontally across the collector to the positive electrode. Another role of the current collector is to maintain separation of the electrolytes of the anode side and cathode side. One ongoing goal of battery design is to increase the output power density of the battery. This can be achieved by reducing the weight of the battery. Collectors in bipolar batteries are typically made from metal. Metal foils such as copper and aluminum foils are used to decrease the weight. Recent developments have incorporated polymers into the collector in an effort to further reduce the thickness of the metal needed for transmitting the current. However, some metal layer was still required to transmit current and prevent the migration of the electrolyte.

7. To fulfill the long-felt need for thinner and lighter batteries, we reduced the weight of our battery by eliminating the need for a metal layer on the surface of the collector. Our collector is made of a high-polymer material containing a plurality of electrically conductive particles. It was unexpectedly discovered that the use of high-polymer material, in particular polyethylene terephthalate, polyimide and polyamide, prevents the volatilization and migration of the electrolyte similar to a metal layer. This phenomenon is illustrated in the attached graph, Attachment A, illustrating the weight of the electrolyte over time when used with collectors of different polymers. Polyimide, polyethylene terephthalate and polyamide are graphed against polypropylene from three different manufacturers. In addition, the combination of the electrically conductive particles in the polymer collector and no metal layers on the outside of the collector allows for the electrical current to pass vertically rather than along the collector surface. The collector can be made very thin and does not require an outer metal layer, thereby reducing the weight and thickness of the battery. The graph of Attachment A represents the results of experiments I conducted.

8. In contrast, Munshi discloses a battery comprising a collector of

polymers including low-polymer material. Munshi discloses the use of polyester, polypropylene, polyethylene napthalate, polyethylene, polyvinylidene fluoride, polycarbonate, polyphenylene sulfide and polytetrafluoroethylene. (Col. 22, ll. 2-8). In Figs. 1A and 1B, metal layer 16 overlies plain polymer substrate 12. (Col. 22, ll. 13-15). The polymer substrate may be impregnated with an electronically conductive element and metalized on both sides of the substrate, as shown in Fig. 3. (Col. 22, ll. 28-31). Munshi does say that metallization of the impregnated polymer substrate is optional. (Col. 22, ll. 52-54). However, Munshi goes on to say that it is preferable if the anode substrate is metalized with copper and the cathode substrate is metalized with aluminum. (Col. 22, ll. 56-59). The polymer substrate renders the collector very flexible for ease of coating and handling. (Col. 22, ll. 63-65). In the first exemplary battery described in Munshi, the collector is an aluminum coated polymer. The aluminum layer ranges in thickness as shown in Table 1 of Example 4. Examples 1-3 do not discuss a collector. In Example 5 of Munshi, a double-metalized substrate is disclosed comprising a polymer substrate 12 and metallization layers 16a and 16b in Fig. 1C. Another alternative is to laminate anode and cathode active elements on respective opposite sides of a double-metalized substrate as described, with the substrate further impregnated with electronically conductive material, as shown in Fig. 3. (Col. 26, ll. 5-15). The thickness of the metallization layer on the polymer layer of the substrate is selected according to the desired conductivity of the layer. (Col. 27, ll. 52-55). Example 6 uses a metal foil collector. (Col. 28, line 3).

9. As one skilled in the art, Munshi does not teach the use of high-polymer collectors containing a plurality of electronically conductive particles, the collector directly contacting the cathode and anode on respective opposite sides of the collector. Munshi clearly teaches the use of a polymer substrate layered with metal to make the collector more flexible and easy to coat. Therefore, Munshi cannot achieve the advantages of no metallic layer.

10. Also in my opinion as someone skilled in the art of bipolar battery materials and design, the battery structure as claimed in the application at issue is not rendered obvious by the combination of Munshi (U.S. Patent No. 6,664,006) and Hwang et al. (US Patent Application Pub. No. 2005/0084760).

11. Hwang et al. discloses a collector including a polymer film with a

metal deposited on the polymer film. (¶[0012]). The metal deposited on the polymer film has a specific thickness. If it is too thin, it cannot completely cover the surface of the polymer film. (¶[0019]). Although Hwang et al. discloses the use of higher molecular weight polymers, Hwang et al. obviously does not realize the unexpected result of eliminating migration of electrolytes, as the polymer is covered with the coating of metal.

12. A fundamental difference between the claimed invention and the Munshi and Hwang et al. references is the claimed polymer collector without a metal layer and the unexpected performance of the specific high-polymer materials in maintaining the electrolyte. As one skilled in the art, it is my opinion that Munshi alone or in combination with Hwang do not teach, suggest or render obvious the invention recited in the claims of the application at issue.

I, the undersigned, being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. Section 1001, and that such willful false statements may jeopardize the validity of the application or any resulting registration, declares that the facts set forth in this application are true; all statements made of his own knowledge are true; and that all statements made on information and belief are believed to be true.

3/14/2009 — Shigeo Ibuka

Date — Name: Dr. Shigeo Ibuka